4.0 QUALITY CONTROL PROGRAM

All investigative data collected for this site was definitive data. Definitive data measures organic/inorganic particulates using EPA procedures and produces data that can be used in risk assessment, site characterization, alternative evaluation, engineering design, and monitoring during implementation. The data obtained conforms to the quality control requirements specified in the Quality Assurance Project Plan.

The Quality Assurance/Quality Control (QA/QC) evaluation of the laboratory data concludes that the results of the analytical data meet the requirements of the Quality Assurance Project Plan (QAPP) and per the analytical methods (see Appendix A – CDQAR). Specific Quality Assurance (QA) measurements were addressed to satisfy the QA objectives. Those measurements included precision, accuracy, representativeness, completeness, and comparability.

The analyses of soil samples collected during this site investigation are specific to this site based on data from previous investigations (see Section 1.3 for a list of previous environmental investigations). The analysis of the soil samples included all methods described in the QAPP. The soil samples were tested for the following: Total Petroleum Hydrocarbons, extractable and purgeable (TPH-E, TPH-P) by EPA method 8015B; Volatile Organic Compound (VOC) by EPA method 8260B; Semi-Volatile Organic Compound (SVOC) using EPA method 8270C; Gross Alpha and Gross Beta Particles using EPA method 9310; Pesticides using EPA method 8081, and California Title 22 metals by EPA methods 6010B and 7471A. The California Title 22 Metals include the following: antimony, arsenic, barium, beryllium, cadmium, chromium, cobalt, copper, lead, mercury, molybdenum, nickel, selenium, silver, thallium, vanadium, and zinc. Gasoline and diesel standards were used in the TPH analysis as appropriate.

4.1 Quality Control Samples

4.1.1 Field Replicates – N/A

4.1.2 Field Duplicates

The field quality control (QC) samples collected are as shown in Table 4-1. QC duplicate samples collected in the field provide precision information for the entire measurement system

including sample acquisition, homogeneity, handling, shipping, storage, preparation, and analysis. Although 10% duplicate samples (two samples) had been proposed in the work plan, one duplicate sample was collected from the field. The overall measure of precision was based on the one duplicate sample. Also, data from the twelve split samples collected for FNC may be used to corroborate any USACE's sample analysis results. QC sample location sites were based on information collected in the field. Duplicate samples were analyzed using the primary sample parameters. QC sample location sites were based on information collected in the field. Duplicate samples were analyzed using the primary sample parameters.

4.1.3 Matrix Spike/Matrix Spike Duplicates (MS/MSD)

A Matrix Spike (MS) is an environmental sample to which known concentrations of analytes have been added. The MS is taken through the entire analytical procedure and the recovery of the analytes is calculated. Results are expressed as percent recovery. The MS is used to evaluate the effect of the sample matrix on the accuracy of the analysis.

A Matrix Spike Duplicate (MSD) is an environmental sample that is divided into two separate aliquots, each of which is spiked with known concentrations of analytes. The two spiked aliquots are processed separately and the results compared to determine the effects of the matrix on the precision and accuracy of the analysis. Results are expressed as relative percent difference (RPD) and percent recovery (%R). Additional samples volumes were collected in the field to perform MS/MSD analysis for each analytical method.

Table 4-1. QC Summary for Soil Samples.

Analyses	Samples	QC Dups.	MS/MSD	Equipment Blank
8015B – Total Petroleum Hydrocarbon (TPH-p) – Purgeable, Gasoline	23	1	1/1	0
8015B - Total Petroleum Hydrocarbon (TPH-e) – Extractable, Diesel	23	1	1/1	0
8260B - Volatile Organic Compound (VOC)	23	1	1/1	0
8270C – Semi-Volatile Organic Compound (SVOC)	23	1	1/1	0
9310 – Gross Alpha and Gross Beta Particles	23	1	1/1	0
8081 - Pesticides	23	1	1/1	0

6010 – Title 22 Metals*	23	2	1/1	0
7471 - Mercury (Title 22 Metal)	23	2	1/1	0

*- Title 22 Metals includes antimony, arsenic, barium, beryllium, cadmium, chromium, cobalt, copper, lead, mercury, molybdenum, nickel, selenium, silver, thallium, vanadium, and zinc.

4.1.4 Blanks

4.1.4.1 Equipment Blanks

Because the sampling method used only disposable clear plastic direct push tubes to extract soil samples, no equipment blank samples were collected.

4.1.4.2 Temperature Blanks

A sample container (40-ml VOA vial) of water was labeled as a temperature blank. A temperature blank was included in each shipment and recorded on the Chain-of-Custody. The temperature blank was packaged and handled in the same manner as other samples in order to assure that the temperature is representative of the samples in that shipment. The laboratory used a calibrated thermometer to directly measure the temperature of this sample. This temperature reading determined whether the samples were stored under the appropriate thermal conditions.

4.1.5 Quality Assurance (QA) Samples

No QA split samples were collected for QA purposes. However, split samples were collected between the USACE field crew and the representative from the Friends of Novato Creek (FNC) for the purpose of laboratory analysis if any chemical discrepancies were evident. Matrix spikes/matrix spike duplicates (MS/MSD) will provide the analytical quality evaluation needed.